

- 1 10. The method of Claim 9 wherein the group is an empty group.
- 1 11. The method of Claim 9 wherein the group is a dynamic topology group
2 (DTG).
- 1 12. The method of Claim 9 wherein the step of configuring a DNS server
2 further comprises transmitting the group ID resource record to the DNS server in
3 accordance with DNS Update protocol.
- 1 13. The method of Claim 9 further comprising deleting the group ID resource
2 record that defines the group, thereby deleting the group.
- 1 14. The method of Claim 9 further comprising the step of transmitting a
2 message in accordance with DNS Update protocol to delete the group ID resource record
3 that defines the group, thereby deleting the group.
- 1 15. The method of Claim 9 further comprising the step of adding, in
2 accordance with DNS Update protocol, a group info resource record to associate an
3 additional DNS resource record with the group, thereby adding the respective DNS
4 resource record to the group.
- 1 16. The method of Claim 9 further comprising deleting, in accordance with
2 DNS Update protocol, group info resource records that associate a DNS resource record
3 with the group, thereby removing the respective DNS resource record from the group.
- 1 17. The method of Claim 9 further comprising deleting a group info resource
2 record that associates a DNS resource record with the group, thereby removing the
3 respective DNS resource record from the group.
- 1 18. The method of Claim 9 further comprising modifying one or more group
2 info resource records.
- 1 19. The method of Claim 9 wherein at least one group info resource record
2 defines how a DNS server is to respond to queries for its respective DNS resource record
3 when the group is inactive.
- 1 20. The method of Claim 9 wherein at least one group info resource record
2 specifies that a DNS server responds to a DNS query for a DNS resource record in an
3 inactive group exactly as if the DNS resource record did not exist.

1 21. The method of Claim 9 wherein at least one group info resource record
2 specifies that a DNS server responds to a DNS query for a DNS resource record in an
3 inactive group with zero answers with at least one of a TXT resource record and return to
4 service time (RTST) resource record in the additional information section of a DNS
5 response.

1 22. The method of Claim 9 wherein at least one group info resource record
2 specifies that a DNS server responds to a DNS query for a MX resource record in an
3 inactive group with a zero answers so that the next highest priority MX resource record
4 will be queried as a result.

1 23. The method of Claim 9 wherein at least one group info resource record
2 specifies that a DNS server responds to a DNS query for a DNS resource record in an
3 inactive group with a configurable substitute resource record.

1 24. The method of Claim 9 wherein at least one group info resource record
2 specifies that a DNS server responds to a DNS query for a DNS resource record in an
3 inactive group with an alternate address (type A) resource record whose address is the
4 address of a server outside the group.

1 25. The method of Claim 9 wherein at least one group info resource record
2 specifies that a DNS server responds to a DNS query for a DNS resource record in an
3 inactive group with a server failure return code such that client discovers the
4 unavailability of the resource without inferring that the resource does not exist.

1 26. The method of Claim 9 further comprising the step of a single selected
2 computer generating heartbeat messages in accordance with a heartbeat protocol
3 indicating the availability of one or more computer resources represented by respective
4 DNS resource records, such that loss of heartbeat from the selected computer is indicative
5 that all computer resources are unavailable, and the presence of a heartbeat from the
6 selected machine is indicative that all computer resources are available.

1 27. The method of Claim 9 further comprising the step of a single selected
2 computer generating heartbeat messages in accordance with a heartbeat protocol
3 indicating the availability of one or more computer resources represented by respective
4 DNS resource records, such that loss of heartbeat from the selected computer is indicative

5 that all computer resources are unavailable, and the presence of a heartbeat from the
6 selected machine is indicative that all computer resources are available; and the step of
7 the single selected computer requesting a new heartbeat rate, and upon agreement by the
8 DNS server to the new heartbeat, implementing the new heartbeat.

1 28. The method of Claim 9 further comprising the step of a single selected
2 computer generating heartbeat messages in accordance with a heartbeat protocol
3 indicating the availability of one or more computer resources represented by respective
4 DNS resource records, such that loss of heartbeat from the selected computer is indicative
5 that all computer resources are unavailable, and the presence of a heartbeat from the
6 selected machine is indicative that all computer resources are available; and the step of
7 the DNS server imposing at any time a minimum heartbeat period on the selected
8 computer.

1 29. The method of Claim 9 further comprising the step of a single selected
2 computer generating heartbeat messages in accordance with a heartbeat protocol
3 indicating the availability of one or more computer resources represented by respective
4 DNS resource records, such that loss of heartbeat from the selected computer is indicative
5 that all computer resources are unavailable, and the presence of a heartbeat from the
6 selected machine is indicative that all computer resources are available; and generating a
7 message by the selected computer in accordance with the heartbeat protocol to deactivate
8 the group.

1 30. The method of Claim 9 further comprising the step of a single selected
2 computer generating heartbeat messages in accordance with a heartbeat protocol
3 indicating the availability of one or more computer resources represented by respective
4 DNS resource records, such that loss of heartbeat from the selected computer is indicative
5 that all computer resources are unavailable, and the presence of a heartbeat from the
6 selected machine is indicative that all computer resources are available; generating a
7 message by the selected computer in accordance with the heartbeat protocol to deactivate
8 the group; and generating an acknowledgement message by the DNS server to the
9 selected computer prior to deactivation of the group.

1 31. The method of Claim 9 further comprising the step of a single selected
2 computer generating heartbeat messages in accordance with a heartbeat protocol
3 indicating the availability of one or more computer resources represented by respective
4 DNS resource records, such that loss of heartbeat from the selected computer is indicative
5 that all computer resources are unavailable, and the presence of a heartbeat from the
6 selected machine is indicative that all computer resources are available; generating a
7 message by the selected computer in accordance with the heartbeat protocol to deactivate
8 the group and indicate a return to service time (RTST); and generating an
9 acknowledgement message by the DNS server to the selected computer prior to
10 deactivation of the group.

Sub C1
1 32. A method for implementing a heartbeat protocol, comprising generating
2 heartbeat messages by a single selected computer indicating the availability of resources
3 on one or more computers, such that loss of heartbeat from the selected computer is
4 indicative that all computer resources are unavailable, and the presence of a heartbeat
5 from the selected machine is indicative that all computer resources are available.

1 33. The method of Claim 32 further comprising the step of the single selected
2 computer requesting a new heartbeat rate, and upon agreement by the server to the new
3 heartbeat, implementing the new heartbeat rate.

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1 34. The method of Claim 32 further comprising the step of the server
2 imposing at any time a minimum heartbeat period on the selected computer.

1 35. The method of Claim 32 further comprising the step of generating a
2 message by the selected computer in accordance with the heartbeat protocol to indicate
3 unavailability of the one or more computer resources.

Sub B3
1 36. The method of Claim 32 further comprising the step of generating a
2 message by the selected computer in accordance with the heartbeat protocol to indicate
3 unavailability of the one or more computer resources; and generating an
4 acknowledgement of unavailability message by the server to the selected computer.--